

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 1-6 recites “apparatus for simultaneous transmission of at least a first signal and a second signal, each of said signal comprising:”. The claim directed to a single means claim; a single means claim, i.e., where a means recitation does not appear in combination with another recited element of means. A single means claim which covered every conceivable means for achieving the stated purpose was held nonenabling for the scope of the claim because the specification disclosed at most only those means known to the inventor (see MPEP 2164.08 (a)).

### ***Claim Rejections - 35 USC § 101***

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 8-13 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 8-13 recites "Simultaneous signals for transmission by an apparatus as claimed in claim 1" and is directed to a signal claim. This subject matter is not limited to that which falls within a statutory category of invention because it is not limited to a process, machine, manufacture, or a composition of matter. Instead, it includes a form of energy. Energy does not fall within a statutory category since it is clearly not a series of steps or acts to constitute a machine, not a tangible physical article or object which is some form of matter to be a product and constitute a composition of matter.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 1 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raleigh et al. (US 6,452,981 B1).

(1) Regarding claim 1:

Raleigh discloses an apparatus (transmitter in figure 1) for simultaneous transmission of at least a first signal and a second signal (this allows for simultaneously transmission of training and data thus reducing overhead, column 8, lines 20-22), each one of said signals comprising a data sequence and a training sequence (the training

symbols injection block 20 in figure 1 may inject training symbols in the transmitted symbol stream periodically in time or frequency, column 6, lines 7-15, a preferable MIMO channel identification technique operates with embedded training sequence inserted into the data stream, by training symbol injection block 20 in each burst, column 30, lines 23-27) characterized in that said apparatus is arranged to simultaneously transmit a training sequence of said first signal and a data sequence of said second signal (there is no requirement that the training symbols always reside in the same bins from burst to burst, as long as the transmitter and the receiver both know where the training symbol are placed, column 32, lines 48-52, if the location of the training sequence is not fixed, it is obvious that a transmission of a training sequence of one bin and the transmitting of a data sequence of the second bin can happen at the same time).

(2) Regarding claim 8:

Raleigh discloses a MIMO system that said simultaneous signals comprising at least a first signal and a second signal (signals from each transmitting antenna) and said first signal and second signal comprising a data sequence and a training sequence (it is well known in the art that symbol from each antenna of the MIMO system comprises a preamble field that comprises training symbol and a data field) wherein, a training sequence of said first signal and a data sequence of said second signal are arranged to be simultaneously transmitted (there is no requirement that the training symbols always reside in the same bins from burst to burst, as long as the transmitter and the receiver both know where the training symbol are placed, column 32, lines 48-

52, if the location of the training sequence is not fixed, it is obvious that a transmission of a training sequence of one bin and the transmitting of a data sequence of the second bin can happen at the same time).

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Mody et al. (US 7,088,782 B2) discloses a time and frequency synchronization in multi-input, multi-output (MIMO) systems. Li (US 2003/0021332 A1) discloses a channel estimation for wireless systems with multiple transmit antennas. Al-Dahir et al. (US 2005/0265478 A1) discloses a training-based channel estimation for multiple-antennas.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SIU M. LEE whose telephone number is (571)270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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